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THE DEVELOPMENT

of the

Sugar and Cane Industry

IN FLORIDA

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Sugar and Cane Syrup In Florida

By
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SUGAR AND CANE SYRUP IN FLORIDA

An Address delivered before the Seventy-third Annual Meeting of the American Association for the Advancement of Science, at Chicago, December 30, 1920, and before the General Sales Meeting of The R. L. Dollings Company of Columbus, Ohio, at Columbus, December 31, 1920.

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I am asked to speak to you for half an hour on the development of the sugar and cane syrup industries in Florida.

As a background to the discussion, I must sketch in barest outline the sugar situation of the world.

Any discussion of this matter just now is beset with embarassment. The disorganization of the industry by the world war, the derangement of international credits and exchanges, the inability of Europe to import goods and pay for them, the destruction of ships and the paralysis of transportation both by land and sea, the inflation of sugar prices and their sudden collapse, the greatly increased cost of production and in particular the scarcity and high wages of labor, are some of the abnormal elements which disturb all our calculations, and render the forecost of events uncertain. But some leading facts may be mentioned:

1. The annual consumption of sugar in the world amounts normally in round numbers to nearly twenty million short tons. Of this amount, something more than one-half is cane sugar, and something less than one-half beet sugar, the two being practically identical in substance and use, the former a product of tropical and subtropical regions, the latter of the temperate zones.

2. The production and consumption of cane sugar has wonderfully increased in recent years. It is estimated that the **per capita** consumption is now ten times as great as it was a hundred years ago. In 1904-05 production amounted to seven and a half million short tons; in 1917-18 to thirteen and a half million short tons; that is to say, the consumption of cane sugar nearly doubled in fourteen recent years, a fact whose immense significence I have never seen adequately discussed and estimated. The production of beet sugar in the

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meantime (it may be added in parenthesis) increased at first and then diminished, remaining about stationary on the average during these fourteen years.

What were the causes of this vast recent increase in the use of sugar? And will these same causes, and others, keep up this rate of increase in the future?

For one thing, it may be remembered that chemists and dieticians have emphasized the food value of sugar in reasonable quantities, as never before. The most recent book on Chemistry which I have read ("Creative Chemistry" by Dr. E. E. Slosson, The Century Co., 1920) says: "Common sugar is almost an ideal food—cheap, clean, white, portable, imperishable, unadulterated, pleasant-tasting, germ-free, highly nutritious, completely soluble, altogether digestible, easily assimilable, requires no cooking and leaves no residue." For another thing, the consumption of candies, ice cream, soft drinks, sweet chocolates, cakes and crackers, glaced fruits and nuts, preserved fruits, condensed milk, and other similar products has grown by leaps and bounds, all making heavy demand on the sugar bowl.

For still another thing, the pace and exhaustion of a life which talks by telephone and wireless, rides in automobiles, crowds the cities, plows with tractors, creates huge corporations, figures in millions and billions, and has forgotten how to rest and think—a push and strain which has caught hold of us all—call as by instinct for greater supplies of energy, and it is sugar which provides this energy in amplest measure and most easily available form. Still other facts are, the increasing exploitation of the tropics by the colonizing and commercial nations and the greater wages of the working classes, which have made it possible for them to obtain and enjoy such quantities of commodities as they were formerly unable to command—they have always had a sweet tooth, but it is only of late that they have been able to indulge it.

Will the demand for sugar continue to increase? It seems likely that it will, for these same causes may be expected to go on operating, while two others have now been added, the appetite for sweets which millions of men gained in the camps and on the battle fields of Europe during the war, and the craving which the withdrawal of alcoholic drinks leaves behind it. Prohibition seems about to sweep the earth; intoxicants are likely to be harder and harder to get, and costlier; and in sugar men find something to satisfy, at least in part, the craving for stimulants. What alcohol pretended and seemed for the moment to do, sugar really does; it gives vigor, stimulus, uplift and flavor to life, and without biting in the end like a serpent or stinging like an adder.

3. The United States consumes more sugar than any

other county, about one-fifth of the whole world's output, about four million short tons annually. Our **per capita** consumption, some eighty-five pounds, exceeds that of any other large country except Great Britain and Australia.

4. Of the four million tons annually consumed in this country, we produce about one-quarter at home and about one-quarter in our insular possessions, the Hawaiian Islands, the Philippines, and Porto Rico; the other half of our sugar supply we import from foreign countries, chiefly Cuba.

5. The cost at retail of the white granulated sugar consumed by the people of the United States, under normal price conditions, is upwards of five hundred millions of dollars annually.

I suppose we are all agreed that if the whole or a larger part of the sugar we use could be produced by ourselves economically, it would be highly desirable from every point of view that this should be done. Those who accept the theory of a protective tariff would go further; they would maintain that our people could well afford to pay a slightly higher price for this commodity, if necessary, if this policy would result in establishing the industry on firm and durable foundations, thus making us independent of other countries in this vital matter in times of world convulsion, of possible blockades and submarine warfare. This is my own view,but I suppose that even the most convinced free trader would be glad to see an agricultural and manufacturing industry of this huge magnitude built up within our borders.

And this brings us to the question whether it is possible for this country, either independently of tariff protection or with its help, to produce cane sugar with profit on a very large scale. In order to answer this question intelligently, three other questions should be asked and answered: Have we in any part of our continental domain a suitable climate? Have we suitable soils? Have we a supply of labor, sufficient in amount, and not too costly?

In the limited time at my disposal, I cannot undertake to discuss these questions with any fullness; however, a partial and an affirmative answer is found in the fact, familiar to every one, that cane sugar has been manufactured in Louisiana, and to a limited extent in Texas, for many years. Also, cane has been grown for syrup in the other Gulf States, Mississippi, Alabama, Georgia and Florida, and in the Carolinas. I have no doubt that the production of both sugar and syrup can be greatly and profitably increased in much of this immense coastal plain area. My subject, however, is Florida, and I hope that I can say without offense that Florida has certain advantages in this matter, not enjoyed by any other American State.

And first, as to climate.

It must be admitted that there is always some risk involved in growing tender tropical plants in regions subject to occasional freezes, as Florida and all other parts of the United States are. This is true of citrus fruits, for example, and it is true of sugar cane; but this risk has not prevented the development of a great and profitable orange and grape-fruit industry in Florida and California, despite occasional disaster, and neither has it prevented the development of the sugar and syrup industries in Louisana, which is more subject to frost than is the major part of Florida. In the northern and western portions of the State, the cane may be harvested and windrowed or banked in the late autumn, while in South Florida the risk of injury from this cause is negligable.

Another favorable climatic condition is the copious rainfall of Florida, from fifty to sixty inches, together with the fortunate fact that this rainfall normally occurs in the summer, when cane is growing and in need of a great abundance of moisture, while the ripening and harvesting period is usually dry. Also, flowing wells in vast areas of the best cane land make it possible to irrigate fields cheaply and easily in the spring, if this should chance to be droughty. And above all, there is the famous Florida sun, seldom obscured by clouds for long, and flooding the air and penetrating the soil with its life-giving energy. That the Florida climate is favorable for the growth of cane has been demonstrated by the experience of more than a century; it always has been our safest and surest staple crop; it never wholly fails.

Next, as to soil.

It is a common opinion that the lands of Florida are generally thin and ill-adapted to the growing of such gross-feeding crops as sugar-cane. This is true in part, but only in small part.

Florida contains a great variety of soils. According to estimates prepared for me by the State geologist, she has some six thousand square miles of muck lands, largely in the Everglades; another six thousand square miles of high, middle and low hammocks, covered with a heavy growth of hard woods; still another six thousand square miles and more of open prairie lands, or savannahs, along the river courses; some eighteen thousand square miles of so-called flatwoods; and thirteen and a half thousand square miles of high pine lands, besides a comparatively small area of scrub lands and swamps. Cane can be grown successfully, and has long been grown, on all these types of soil, except the scrub lands and the swamps. But the high pine lands, the so-called "pine barrens", while producing a cane of high sucrose content, must be fertilized rather heavily, if a considerable tonnage is

to be produced; what is perhaps more important, these lands in seasons of scanty rainfall are apt to be deficient in moisture, and they have no flowing wells. But the muck lands, prairies and hammocks, an enormous area, are suited in a very high degree to the growing of cane. Some of these lands need to be drained, indeed, but the drainage is comparatively easy and inexpensive; some of them need to be "sweetned"; in some of them time and treatment may be required to promote the necessary bacterial growth; but taking them as a whole, they have great fertility, and they produce a heavy tonnage of cane, of high sucrose content, from which rattoon crops may be expected in south Florida for a number of years, without replanting. Do they need to be fertilized? Assuredly, after the first years of cropping. I hold it as an axiom in agriculture that in the long run nothing can be taken from the soil—any soil, anywhere—which is not first put into it, either by nature as in the overflows of the Nile and other valleys, or lacking this, by the hand of man, through legumes and manures.

Fortunately, Florida has vast deposits of phosphate and lime, while such legumes as the velvet bean, the cowpea, the soy bean, the peanut, Kudzu, and beggar-weed grow profusely. It is enough to say, and so much is certain, that large areas of these muck, hammock, and prairie lands of Florida can be depended on to produce from thirty to forty tons of sugar cane per acre, when properly handled, as against a present average in Cuba of twenty-one tons, in Porto Rico of twenty tons, in Louisiana of eighteen tons, and in the Hawaiian Islands of forty-four tons, harvested, however, for the most part in Hawaii only once in two years. On a small experimental tract of prairie land I have this year grown upwards of thirty tons per acre, without any cultivation or fertilizer whatever.

As to our eighteen or nineteen thousand square miles of flatwoods—by which is meant low and moist pine lands—it must be allowed that these vary greatly in nature and quality, both as concerns the surface soil and the sub-soil; but speaking "by and large," these flatwoods are well adapted to the growing of cane. Mostly they need drainage, both to carry off the surface water in wet weather and to lower the permanent water table to a proper depth; this done, such flatwoods as have a suitable sub-soil can be relied upon to produce luxuriant and profitable crops of sugar cane, though perhaps not so large a tonnage as the muck lands, the alluvial prairies, and the heavier hammocks. I have myself just harvested a crop of thirty-eight tons per acre, on flatwood lands, suitably fertilized.

Taking these various types of soil together, I have no doubt that it is well within the bounds of truth to say that

Florida has fifteen or twenty million acres of land which is either already adapted to the growing of sugar cane, or which can readily be prepared for this use by clearing and drainage, and that on half this area, allowing thus for crop rotation, two hundred millions of tons of cane could be grown in a fairly favorable season. And two hundred million tons of cane, of good sucrose content, would make as much sugar as the whole world now produces, both cane and beet. Of course, this statement is only theoretical, for no one supposes that more than a fraction of this enormous area will ever in fact be devoted to this or any other single crop.

It may be added that the average sugar content of Florida cane is considerably greater than that of Louisiana, and at least equal to that of Hawaiian or Cuban cane. Dr. H. W. Wiley, then chief of the Bureau of Chemistry, reported in 1906 that the richest cane ever analyzed in the Bureau was grown in Florida. And good cane land in Florida can still be bought at a very low price.

The supply of labor.

After climate and soil, the next most important question is that of an adequate supply of labor. The lands of Florida are level, free from stones, and otherwise especially adapted to implemental cultivation. It is only in the harvesting of the cane that a large amount of hand labor is required. We may have some difficulty at this point; but the harvest fortunately extends from early November in northern Florida to late spring in the south, so that labor can be shifted from one region to the other. Morever, a large amount of migratory labor has in recent years been attracted to the State for the picking and packing of citrus fruits, and to a less extent for the growing and harvesting of truck, just as has happened in the wheat growing sections of the West. Florida is especially attractive in the winter, and it ought to be possible, if the need should arise, and if the effort were properly organized, to bring into the State a multitude of "hands" from the North where agricultural operations are largely suspended during the winter, for the cane harvest. Meantime, a considerable amount of native negro labor is available, at reasonable wages.

What I have said may be summarized and supplemented as follows:—

1. The consumption of sugar has amazingly increased in recent years, both in the aggregate and **per capita**, and may be expected to increase rapidly in the future, independently of the fact that the population of the world, and particularly of the United States, is always growing, so that there are ever more mouths to be fed.

2. The making of sugar is certain to be always a pro-

fitable industry, taking the world together; for if it becomes at any time unprofitable, the product will fall off, and there will ensue a deficit in the supply and a consequent increase in the price, which will bring the industry back once more to a profitable basis—there is no escaping this fundamental economic law.

3. Seven conditions must be met in land available for the growing of sugar cane, conditions of latitude, of altitude, of topography, of moisture, of soil, of transportation, and of price; that is to say, the land must be within or near the tropics; it must lie not too far above the sea and therefore in unfavorable conditions of atmosphere and temperature; it must be fairly level; it must be copiously watered either by rainfall or irrigation, and yet well drained; the soil must be such that it can be cultivated easily and economically by machinery; it must be accessible to transportation and preferably near the world's large sugar markets; and it must be cheap in first cost and not too expensive to clear and prepare for use. Land may be found in various parts of the world which meets one or more of these conditions, but a glance at the map and a little study of physical geography will show, I think, that there is nowhere else a solid body of unoccupied or scantily occupied and idle lands which meet all these conditions, in any degree comparable in extent to that comprised within the State of Florida.

4. Although the United States now produces a much greater quantity of beet sugar than cane sugar annually, I think it must be agreed that cane has sundry important advantages over beets, as the raw material for this product. Beets occupy land which will increasingly be needed for wheat, corn, and other staple farm products; they call for a far larger capital investment in land and mills than does cane; they require a larger acreage to produce a given quantity of sugar; their cultivation necessitates more hand labor; and on account of climatic conditions, they must be harvested and manufactured into sugar in a short space of time.

5. If the production of cane sugar is profitable anywhere, it should be profitable in Florida; soil, abundance of available capital and labor, a government likely for a number of years to come to be in active sympathy with the protection and development of the essential American industries; and proximity to the world's greatest market and most insatiable appetite for sweets, are all conditions which, I think, warrant this conclusion.

6. It may be added that the growing of cane and of live stock go well together; each complements and supports the other; and for the live stock industry Florida has incomparable advantages in her genial and healthful climate, her long

grazing season, the number of improved grasses and of leguminous and other forage crops which she can grow, her abundant and well distributed rainfull, and the countless rivers, springs and lakes which provide pure water everywhere.

Whether the foregoing considerations and conclusions are valid or not is likely to be put to the test soon, as two large sugar corporations are now planting extensive areas in cane, one near Miami and the other near Palatka, and proposing to install mills in the immediate future for the manufacture of white granulated sugar.

I am myself specially interested in the syrup industry, and concerning this I must say a final word.

No process hitherto used has been able to turn out a standard cane syrup, uniform in color and flavor. Moreover, cane syrup is liable to ferment on exposure to the atmosphere in warm weather, or else to crystallize in the container. Hence, though a delicious and wholesome food product, cane syrup has never found a wide and stable market; it has been necessary to dispose of it quickly, either for local consumption or to packers for blending with glucose. The producer has, therefore, been at the mercy of the buyer, and of conditions which he could not control. Fortunately, this rather hopeless situation has now been remedied—a process has been perfected and tested which, by removing the gums, starches, albumens, resins and other non-saccharine substances and impurities from the juice before it is boiled, produces a syrup which is uniform in color and flavor, no matter what variety of cane is used, no matter what type of soil it grew in, no matter what kind of fertilizer was used in producing it. And this syrup will neither ferment nor crystallize—no more bursting of containers and flooding of floors and shelves, no changing into sugar and molasses. Broker, jobber, grocer, baker and housewife can handle this product, if so inclined, assured of its unchanging quality.

Plans are now on foot for installing a number of mills in various parts of the State, all of which will make use of the process to which I have referred, and will market their product jointly under a common brand; I see no reason why a large and profitable syrup industry as well as sugar industry should not be created in Florida.

But whether this will happen or not, will depend on our people even more than on our soil and climate. Although it costs four times as much to raise an acre of cane in Hawaii as in Cuba, three times as much as in Louisiana, and twice as much as in Porto Rico, the cost per ton of cane produced is less in Hawaii than in Louisiana or Porto Rico, though not less than in Cuba. This is due to several causes, no doubt,

but one of them is this fact which the people of Florida may well ponder; more brains have been mixed in the sugar industry in the Hawaiian Islands than anywhere else on earth. The leaders, many of them the sons and grandsons of American missionaries, have been men of exceptional ability, education, sound judgment, initiative, business sagacity, energy and courage and they have organized and carried on this business, in all its aspects and details, accordingly. Always, the issue of the battle depends on the "man behind the gun."

If the people of Hawaii—and I may add also the people of California—were face to face with the opportunity which now confronts us in Florida, they would soon be supplying the whole country both with its sugar and syrup, to the great advantage of the nation and with great profit to themselves; what the men of Florida will do with this opportunity remains to be seen.

For an exhaustive study of this subject, see "The Sugar Situation," by C. Lyman Spencer, the Drew Press, Jacksonville, fifty cents. See also several pamphlets by Hon. W. A. McRae, State Commissioner of Agriculture, and Capt. R. E. Rose, State Chemist and sugar expert, "Cane Sugar Industry," U. S. Department of Commerce, and other government reports.

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